NORTHERN TERRITORY

BOTANICAL BULLETIN

No. 4

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Botanical Notes from the Herbaria
of the Northern Territory
Alice Springs (NT) & Darwin (DNA)

Dept. of Primary Production
Division of Agriculture & Stock
N.T. Government

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1. General Plant Ecology and Biology of the Australian Arid Zone.

J.R. Maconochie Page 1 - 19

2. Checklist of Vascular Plants, of Palm Valley, Finke Gorge National Park, N.T.

P.K. Latz Page 20 - 42

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GENERAL PLANT ECOLOGY AND BIOLOGY OF THE AUSTRALIAN ARID ZONE

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Australia is a continent of about 2,968,000 sq. miles (7.7 x 10^8 ha) of which 81% or 2,406,233 sq. miles (6.2 x 10^8 ha) is either arid or semi arid in that neither horticultural nor agricultural crops can be grown economically.

The dry country has been divided into semi arid - 927,577 sq. miles - 31.3% (2.4 x 10^8 ha); arid - 1,478,656 sq. miles - 49.8% (3.8 x 10^8 ha).

In contrast the humid areas -

Temperate	344,569 (0.9 x 10^8 ha)	- 11.6% of land
Tropical	217,107 (0.6 x 10^8 ha)	- 7.3% of land

The arid zone is currently being used for either cattle or sheep production. Cattle in the northern areas; sheep in the southern and eastern. Tourism and mining also contribute significantly to the economy of this vast arid zone.

LAND FORM

The terrain of the arid lands comprises:-

(a) Desert sand-dune complexes
(b) Sand plain areas
(c) Stoney or gibber plains
(d) Small mountain ranges

Generally the land surface is old in geological terms, it has a low fertility and most drainage is internal.

Lake Eyre is an inland salt lake sometimes full of water. It was on this lake Donald Campbell broke the land speed record in the 1960s.

CLIMATE

At Alice Springs the annual average rainfall is about 10 ins. or 250 mm with a 70% predominance in summer. This value can range from 50 mm to 760 mm in an exceptional year. Northwards

the annual average rainfall increases to about 370 mm at Tennant Creek (500 kms), about 890 mm at Katherine (1200 kms) and 1500 mm in Darwin, where it is fully monsoonal in origin.

To the south of Alice Springs, the rainfall drops off to about 120 mm or less in the area of Birdsville, Marree and Coober Pedy, then begins to increase to around 250 mm on the Australian Bight to Port Augusta.

In the northern areas the rainfall is predominantly during summer (November to March) and is associated with low pressure systems or monsoon troughs which enter in the upper east or west of the continent. In the south the rainfall is predominantly winter affected.

Alice Springs has a July mean of 12.5°C (55°F). During winter the weather consists mainly of clear blue skies during the day and cold frosty nights. The high back radiation results in a steep drop in temperature of about 20-30°F or 11-16°C. During the summer period the weather is hot and dry and it becomes humid only when the monsoons move southward; the January mean is 30.5°C (87°F).

VEGETATION

The vegetation of the arid zone comprises the following types:-

1. *The open wood or shrubland* such as the mulga (*Acacia aneura*) association. This is an open or mid-dense shrubland or sometimes considered a woodland with an annual grass-forb ground cover of *Aristida* spp., *Eragrostis* spp., *Sporobolus*, *Eriachne*, *Digitaria* and others or a perennial grass-forb such as *Eragrostis* - *Triodia* spp.

   Forb components are members of *Chenopodiaceae*, *Asteraceae* *Brassicaceae*, *Amaranthaceae*, *Fabaceae* and others. The vegetation is found on the red sandy loams and may form grove - intergrove patterns north of Alice Springs similar to those seen in the Sudan of northern Africa.

   Three other types of similar woodlands found in the centre are the

   a. *Acacia georginae* (Gidyea) and
   b. *A. cambagei* communities which have a more typical tree form with a definite crown and main trunk. These trees when in flower have a very unpleasant smell like rotting meat.

c. A. calcicola a low woodland mostly found on limestone areas to the east of Ayers Rock.

In the southern areas of Australia myall Acacia papyrocarpa (formerly A. sowdenii) is one of the dominant trees of the saltbush - bluebush areas. This tree makes hard work of life by flowering, fruiting and producing new shoots during November-December, when it is a time of very high temperature, long days and minimal rain.

2. Spinifex-shrubland community. This vegetation type is characteristic of the red sand plains and desert dune complexes, and often extends up mountain slopes. Structurally it is a hummock grassland which is either sparsely or densely interspersed with small shrubs of Acacia, Hakea, Grevillea, Cassia and mallee eucalypts.

The dominant species are either Triodia or Plectrachne.

In the dune field areas there is present one of the largest trees of the centre viz. the desert oak (Casuarina decaisneana) which reaches a height of over 20 m and a diameter of 0.5 m. Their age is unknown but from their slow rate of growth it is probably reasonable to consider them at least 500-1,000 years old.

Spinifex country is very susceptible to fire and is probably now dependent on fire for regeneration. After a fire, it takes about 7-10 years to return to the original standing biomass.

3. Tussock grassland - Mitchell grass plain. This vegetation type is dominated by the perennial grasses Astrebla spp. and sometimes mixed with Eragrostis spp. Forbs and other annual grasses comprise the other components.

These tussock grasslands are found on the black-grey or red cracking clays which extend across the northern arid zone from Western Australia to the Darling Downs of Queensland. For the most part, these are flat or undulating grass plains showing a striking lack of trees or other shrubs.

In the south they are more localized. These plains are the highly productive areas which are heavily utilized by the sheep and cattle industries.

The mitchell grasses are interesting in that they have a two layered root system:-

a) an upper system in the top 15 cm which utilize light falls of rain.

b) a lower and deeper system extending to 2 m, utilizing deeper moisture.

4. The Chenopod shrubland. This community is mainly southern in its distribution and occurs on the sandy-loam plains often in association with mulga or myall or as localized units in heavy clay soils or saline areas.

The dominants are either the saltbushes e.g. Atriplex (A. nummularia, A. vesicaria) or bluebushes e.g. Maireana (formerly Kochia) shrubs.

It is this country which is grazed by sheep, for the Australian wool clip production.

During drought periods the Atriplex, in particular drop their leaves and appear as dead standing stalks. When adequate rain falls new shoots develop from the old root stock.

FLORA OF THE ARID ZONE

The eremaen zone as a whole has something like 161 endemic genera of which 63 are monotypic, i.e. there is only one species in the genus, e.g. Brunonia.

In general terms, the eremaen zone has something like 47% of the total endemic genera, the majority in Western Australia.

In the central Australian region within the Northern Territory, we have about 1,200 species of which there is about 60% endemism.

The tropical zone has a much higher endemism (70%) particularly the Darwin Gulf - Victoria River District.

The dominant tree - shrub of the arid zone of the Northern Territory belongs to either the genus Acacia (70 spp.) or Eucalyptus (25 spp.). Eremophila spp. are also important. It is also interesting to note that the Australian Acacias are all mostly phyllodinous, i.e. mature trees do not have true leaves but rather a functional petiole, the phyllode. The true pinnate leaved species are either tropical or temperate zone in habitat except for the cosmopolitan species Acacia farnesiana which is the only species with the characteristic thorns typical of the African species.

1. The Ephemeral or Annual Component

In 1967 the drought (of 8-10 years duration) had just broken. There was considerable ground cover but it was mainly "pioneer species" and other unpalatable or poisonous species. Fortunately for the country, the pastoralists were in financial difficulties, and could not restock immediately. The good seasons continued for several years and the composition changed from one of herbage (forb) dominance to grass dominance. The net result was beneficial to the pastoralists as the country had not been immediately restocked, and as a result there had been a good seed production from the grasses, good ground cover, hence minimal erosion and maximal litter to act as a seed trap. The follow-up rains in successive years resulted in further establishment of grass seedlings and a return to a more grassy vegetation.

2. Tree and Shrub Regeneration

Regeneration of these elements appears to be related to soil type, rainfall and temperature, with fire being an important factor.

Mulga occurs on the red sandy loams and regeneration takes place from seed. Mulga often shows an even-age or age grouping pattern status and in the areas to the north of Alice Springs it forms grove - intergrove patterns.

To obtain this age status and structure would suggest periodic massive germination and seedling survival.

During the 1970s there was one year in which adequate rain fell every month (25-50 mm) and field observations noted a large number of seedlings of species having a very low frequency of young plants inthe area, e.g. *Grevillea striata* (beef wood).

In contrast to mulga, the shrubs and trees of the deep red sand plains and dunes appear to regenerate by subsurface lateral stems or roots and often form local colonies. This is particularly noticeable after a fire.

This feature has been observed in a number of families *Fabaceae*, *Goodeniaceae*, *Mimosaceae*, *Solanaceae*, *Boraginaceae* and *Sterculiaceae*.

Fire plays a very important role in the ecology of this area and studies have shown that this community takes about 7-10 years to return to the original standing biomass. Over this time period, the composition also changes from a community with a variable composition of annuals and perennials, the pioneers after a fire, to one wholly dominated by the hummocks of *Triodia* and *Plectrachne*.

Fires are usually the result of the dry thunderstorms during September and October when the monsoonal troughs in the north start pushing southwards. These fires are often fierce but short lived and if rains fall afterwards there is an abundance of pioneer species. Regeneration of the "spinifex" hummocks appears to be from either the undamaged subterranean root stocks or from seed trapped in the soil, depending on species.

In general the arid zone flora of Australia has many of the characteristics of other arid zone floras but perhaps one influence factor missing is that of the grazing animal with the *cloven* hoof - an introduction of European man.

GROWTH AND PHENOLOGY

The summer-winter rainfall boundary falls diagonally across from Broome in the north west to about Newcastle in the south east. In the north, flowering and shoot growth takes place at the end of the wet season (March-April-July). This is most obvious with the *Acacia* spp. As one moves southwards from Darwin, flowering occurs later and around Alice Springs the wattles and other shrubs flower from July to September.

In the south flowering takes place in September - synchronized with the southern spring where day length and temperature are important factors.

By contrast, many of the trees and shrubs of the northern tropical zone burst into flower around October-November just prior to the "wet season". Others are post wet viz. *Acacias* in flower during April-May.

The growth responses of the herbage and grass component of the arid flora is dependent on time of rainfall and temperature regime.

With late summer-autumn rains this usually means that there is an abundance of wildflowers. These belong to the *Asteraceae*, *Amaranthaceae*, *Brassicaceae*, *Fabaceae*, *Goodeniaceae*, *Zygophyllaceae*, and the less showy but spiny *Sclerolaena* (formerly *Bassia*) and *allied genera* of the *Chenopodiaceae*.

Once the weather begins to warm up these annuals wither, die and disperse their seed either by wind or animals, such as termites, or small marsupials. With early summer rains, it is the grass component which tends to dominate the ground cover, mostly *Aristida contorta* or *A. browniana* (Kerosene and mulga grasses).

REGENERATION

Regeneration is dependent on a number of factors:-

a) Rainfall - amount, duration of fall, season of.
b) Temperature - season of the year.
c) Fire - intensity, vegetation type.
d) Grazing - cattle or feral or native fauna.
e) Status of soil surface and erosion.
f) Availability of seed and litter (These are some of the important influences affecting regeneration in Central Australia).

The eucalypts are mostly all of mallee habit - that is they have a large lignotuber from which grows a number of slender trunks.

The perennial ground cover is dominated by the grasses *Triodia* (16 spp.) and *Plectrachne* (5 spp.) called spinifex or porcupine grass.

Other important genera in the N.T. arid zone are *Eremophila* (34 spp.), *Cassia* (20 spp.), *Ptilotus* (40 spp.), *Sclerolaena* (35 spp. *Sida* (25 spp.) and others such as *Grevillea*, *Hakea*, *Atriplex*, *Maireana (Kochia)*, etc.

Like other areas of the world the Australian arid zone has a flora whose species can be grouped as:-

a) *Drought Escapers*: these are the annuals which complete their life cycle in a matter of weeks, e.g. *Senecio gregorii*.

b) *Drought Evaders*: the deciduous shrubs, e.g. *Erythrina vespertilio* and *Atriplex nummularia*.

These plants drop their leaves under water stress and only refoliolate when conditions are favourable.

Many of the northern Australian eucalypts, the Sterculiaceae, and other are also deciduous and this obviously permits them to survive the drought period of the dry season from about April/May to November.

c) *Drought Endurers*: this comprises the majority of the trees and shrubs. These plants usually have modifications to leaves and stems which assist in reducing water loss and minimize overheating of tissue.

    i) Sclerophyllous leaves which are narrow cylindrical or flat with a thick cuticle and rigid sclerenchyma as internal tissue.

    ii) Various surface coverings, e.g. hairs, glaucousness, viscidness often giving the surface a grey-white coloration which increases surface reflectance.

    iii) The weeping habit or erect habit in which angle of incidence with light is optimized for light/heat balance.

    iv) The inverted cone habit, e.g. mulga where the foliage, stems and trunk intercept rain and channel it down the trunk.

v) Seeds with varying physiological tolerances to survive and germinate under the arid zone conditions of drought and fire.

It must be remembered that many of the features described here are also present in plants of the higher rainfall regions. These regions are also subject to a summer drought (southern) or a dry season (northern), it may only be a few weeks or months but they still must survive this period.

Over time, the vegetation has evolved and become adapted to survive the following:-

1) Drought - water deficiency.

2) Fire (a) Frequent and low intensity, e.g. aboriginal man and his hunting technique.

(b) Infrequent but of high intensity, e.g. in spinifex between dunes.

3) Grazing - by Marsupials, e.g. Kangaroo and Wallaby - these animals are selective and have low intensity grazing, utilizing the gilgai areas - often producing "lawns". They are mobile and tend to follow the rains.

Termites - grass and seed gathers.

Cattle - less selective.

Man has seriously altered the grazing influence over the last 150-100 years by -

a) Introduction of cattle, sheep, horses, donkeys, camels and rabbits.

b) Increasing the availability of water, e.g. the introduction of bores and dams.

This has resulted in increased numbers of kangaroos during good years thus increasing the grazing pressure on the land.

Over the last 10-15 years the concept of Range Management, as developed by the Americans has become an important factor in conservation of the arid lands, but it is still in its infancy.

Studies are being undertaken by research workers of State Agricultural Departments, Universities and C.S.I.R.O. on the effects of grazing by cattle and rabbits in the various plant communities and their soils.

The results of these studies should enable the cattle producers andother users of the land to better understand the Australian Arid Zone ecosystem, and hence more effectively manage these areas during both conditions of drought and plenty.

RARE AND/OR ENDEMIC PLANT SPECIES IN CENTRAL AUSTRALIA

The mountain ranges in Central Australia although only sparsely covered with vegetation have provided a refuge for a number of species which presumably may have been more widespread during an earlier more mesic climatic period.

Tate (1896) in the Report of the Horn Scientific Expedition to Central Australia was the first to record this floristic feature of the region and it was further developed by Keast (1959) and Chippendale (1963).

Tate called the flora associated with the central ranges, plains and water-courses "The Larapintine flora" the name being derived from the aboriginal word "larapinta" which covered the area of the upper and middle Finke River.

Prior to making his trip Tate had hoped to find remnants of a flora of an earlier and cooler more temperate climate. On visiting the area he realised that both the climate and physiography of the area did not permit suitable conditions for the existence of such floral and faunal remnants. Although some of the peaks of the ranges may rise from 1200 to 1500 metres above sea level, snow does not occur and fog or mist is a very rare event.

Thus although the ranges are sparsely covered with vegetation and do not contain any cool temperate relict plant species they do contain relicts of a more tropical and humid climate and the best example of this is the cycad, Macrozamia macdonnellii. This and other relict species are mostly found on the shaded gullies or steep rock faces of the ranges where they presumably utilize under ground seepage water and because of their shaded or semi-protected habitat are able to keep dessication to a minimum during the hot dry summer period.

Tate (1896) summarized his Larapintine flora as composed of:

1.	Exotic species, chiefly Oriental	125
2.	Endemic species of exotic genera	219
3.	Endemic species of Australian genera	270
	Total	614

Chippendale (1963) took a more critical view of the relict nature of members of the Central Australian flora and defined his relict species of the ranges as those which only represented the flora which existed in the ranges in the past.

About fifty species were listed by Chippendale, many of which were found outside Central Australia but within this area they are restricted to the ranges. Chippendale listed a group of species which are confined to the refuge mountains of South and Central Australia and he considered these as "endemic species undoubtedly representative of a flora which is adapted to the mountain environment of the arid zone".

One of the most interesting relicts is the palm Livistona mariae which is only found in Palm Valley, west of Alice Springs. Latz (1975) has discussed its distribution within this habitat and using photographs taken by visitors to the area in 1917 has been able to estimate the age of the tallest palms to be from 100 to 300 years. Its nearest relative is Livistona rigida which occurs along the water courses at the bottom of the Gulf of Carpentaria near Burketown, Qld., and near Mataranka in the N.T.

This would suggest that its origins like the cycad, Macrozamia macdonnellii are probably of a tropical source.

The following is a descriptive list of some of the more interesting rare or endemic flora found in the Central Australian ranges. The area covered here includes the ranges in the adjacent states of South Australia and Western Australia.

FILICINÆ (ferns)

Adiantum hispidulum - a maidenhair fern restricted to perpetually moist habits in George Gill and Macdonnell Ranges. A cosmopoliton species in tropical Asia, Africa and eastern Australia.

Asplenium bulbiferum - recorded once from Reedy Rock Hole, George Gill Range, known from along stream banks of hilly country of N.S.W., Vic. and Tas.

* *Dicranopteris linearis* - recorded only from Mt. Giles, Chewings Range. A tropical species also found across Northern Australia.

* *Doodia caudata* - a temperate species extending from Qld. to Tas. Known only from Mt. Giles, Chewing Range in N.T. and also one record in the Flinders Range, S.A.

* *Histiopteris incisa* - again one record from Mt. Giles, of this widespread eastern Australian and tropical species.

* *Nephrolepis sp* - A ground fern known only from Tallaputta Gorge where it grows in cracks of rock faces.

Psilotum nudum - found only at Reedy Rock Hole, George Gill Range; this is normally found more in humid areas of northern and eastern Australia.

Pleurosorus rutifolius - a ressurection fern, not common, mostly restricted to shady watercourses of rocky hills.

Other ferns include the ressurection species *Cheilanthes tenuifolia C. lasiophylla, C. sieberi* and *C. vellea* which are widespread throughout the area.

ZAMIACEAE (Cycads)

Macrozamia macdonnellii - this plant is a "living" fossil and can be considered as a true relic species. It is found in both the Macdonnell and Harts Ranges but within a restricted habitat, namely the shady cliff faces and shady gorges.

Related species are found in the rain forest area of eastern Australia and one species in the south-west of the continent.

ACANTHACEAE

Sarojusticia kempeana - a small erect shrub with mauve - blue tubular flowers found in skeletal soil of rocky sandstone hillsides, widespread within the ranges but not common.

AMARANTHACEAE. (pussy tails)

* *Ptilotus royceanus* - a small pendulous shrub found only in the crevices of gorges in the Petermann and Schwerin Mural Crescent Ranges of adjacent N.T. and W.A. respectively.

APIACEAE. (carrot family)

Actinotus shwarzii - "flannel flower", a small perennial with showy white woolly flowers, found only growing in rock crevices of steep cliffs of the Macdonnell Ranges.

It is related to A.*helianthi* of the east coast of the Sydney district and to *A. leucocephalus* of the sandheath in south-western Australia.

* *HYDROCOTYLE sp*. - a small annual-perennial herb only known from Mt. Riddock area.

ARECACEAE (palms)

Livistona mariae - Palm Valley palm, restricted to the watercourses of the Finke Gorge National Park where it provides a tropical oasis scene against the back drop of the sandstone gorges. Related to *L. rigida* of similar habitat in the Burketown - Highland plains area Qld. and Roper - Mataranka area N.T.

ASTERACEAE (daisy family)

Helichrysum kempei - an erect shrub with yellow flowers restricted to rock faces and rocky hillsides of central ranges.

Helichrysum thomsonii - a small sub shrub with white bracts enclosing flower head and viscid leaves. Found growing in crevices of cliff faces and on tops of rocky hills of Macdonnell and George Gill Ranges.

Wedelia stirlingii - a perennial yellow flowered shrub, which although widespread throughout the ranges has a very distinct habitat, amongst rock crevices usually at the base of ridges or in upper slopes.

BIGNONIACEAE

Pandorea doratoxylon - "spearwood", an erect shrub or vine with attractive white tubular flowers with dark internal markings. Found mostly within all the gorges of central Australia.

DILLENIACEAE

Hibbertia glaberrima - a bushy shrub with yellow flowers and soft green foliage which is found in screesites of gorges and in other protected sites within the ranges.

* Hibbertia sp. - a small shrub with yellow flowers only known from Mt. Giles, Chewing Range.

EPACRIDACEAE

Leucopogon sonderensis - a small shrub known only from the upper slopes of Mt. Giles and Mt. Sonder and from the Petermann Ranges. Other members of this genus are either tropical or temperate in origin.

EUPHORBIACEAE (spurge family)

* Euphorbia sarcostemmoides - one of the few arid zone species which has the cacti-succulent habit. It is an erect leafless multi-stemmed shrub found only on the upper slopes of Ormiston Gorge and Kings Canyon.

* Ricinocarpus gloria - medii - a small shrub known only from several stoney hillsides in Simpson's Gap National Park. Other members of this genus are either tropical or temperate.

GOODENIACEAE

* Goodenia faucium - a subshrub with yellow flowers, rare, found growing out of rocky crevices in Mt. Liebig area.

* Goodenia rupestris - a yellow flowered subshrub known only from the Petermann Ranges where it occurs on cliff faces.

LAMIACEAE (mint family)

* Plectranthus intraterraneus - a semi-succulent shrub, aromatic and with attractive blue flowers found mostly amongst rocks at bases of gorges in central ranges.

Prostanthera nudula - an erect shrub, somewhat wiry, mostly leafless, known only from the Everard Ranges S.A. and Docker River and Petermann Ranges, N.T.

* Prostanthera sp. - Asmall shrub with soft orbicular leaves and tubular bluish flowers. Found on the scree slopes of the Petermann Ranges.

Wrixonia schultzii - A small shrubby bush with white flowers and orbicular leaves. Known only from rocky ledges of Mt. Sonder, Mt. Giles and upper ridges of Ormiston Gorge. The only other species of this genus occurs in the Austin district of W.A.

LILIACEAE

Wurmbea centralis - "early nancy", formerly called Anguillaria diocia this small attractive lily is found only along the water course of Mt. Olga, Ayers Rock - Mt. Olga National Park, N.T. and the Flinders Ranges, and adjacent areas in S.A.

MIMOSACEAE (wattle family)

* Acacia auricomum - a small shrub with goldern flower heads, found only on the scree slopes of the Petermann and Bloods Ranges.
* Acacia latzii - a small tree found in the Beddome Ranges west of the Simpson Desert.

* Acacia nelsonii - a small tree, several metres high, found only growing in the watercourses and gally of the Rodinga and adjacent ranges north-west of the Simpson Desert.

Acacia peuce - a tall tree, slow growing with needle like juvenile foliage but becoming pendulous on maturity. Known from two localized populations. One at Andado Station, N.T. and the other at Birdsville, Qld. on gibber plains.

MYOPORACEAE

*Eremophila ovata - an aromatic shrub with lilac to scarlet tubular flowers, restricted to watercourses , gorges of George Gill and Gardiner Ranges.

MYRTACEAE (myrtle or gum family)

* Callistemon sp. - a tall shrub or small tree with weeping foliage and open red bottle brush flowers. Found only in gorges of the Macdonnell and Petermann Ranges.

* Eucalyptus lucens - a mallee with smooth stems and shiney leaves found at Mt. Sonder, Ormiston Gorge and summits of Waterhouse and Krichauff Ranges.

* Thyptomene wittweri - a rounded shrub with white flowers only known from two distinct localities, Palm Valley, N.T. and Mount Augustus, W.A.

POACEAE (grass family)

Eriachne scleranthoides - a perennial hummock grass which is restricted to chasms and rock crevices of Mt. Olga in Ayers Rock - Mt. Olga National Park.

PORTULACACEAE (pigweed family)

Anacampseros australiana - a small erect succulent herb, flowers white, stems and leaves reddish to purple. Rare in skeletal soil on quartzitic or sandstone hills although the species is widespread throughout the ranges of contral Australia.

* Sedopsis filsonii - a small succulent with a perennial root stock which penetrates rock fissures. Flowers are rose-pink and the leaves small succulent reniform and circular. It is relatively widespread within the ranges but its habitat, rock fissures, and the restricted number of plants at each site make it a rare species.

PRIMULACEAE

* *Samolus eremaeus* - a small annual herb found mainly in seasonally moist habitats such as river and creek beds associated with the central Ranges.

PROTEACEAE (protea family)

Hakea grammatophylla - an attractive shrub with pink - scarlet bottlebrush like flowers and straplike leaves. Widely distributed throughout the Macdonnell and George Gill Ranges but again in a restricted habitat of protected gullies and crevices.

* *Hakea standleyensis* - a small shrub only known from inaccessible sites at Standley Chasm and Ormiston Gorge area. A species of only a few bushes within the Macdonnell Ranges.

This species is related to *H. collina* of western Queensland and *H. microcarpa* of the eastern highlands of Australia.

STERCULIACEAE (kurrajongs)

Rulingia magniflora - a small shrub with attractive pink flowers, not common but widespread, in the gorges of the contral ranges from the Everlards (S.A.) to the Macdonnells (N.T.).

Keast (1959) and Chippendale (1963) listed eleven and about thirty plant species of a relic nature, a number of these have not been listed. Since Chippendale's paper more extensive collectings in the area have been made and also with the preparation and publication of the Flora of Central Australia about twenty-one new relicts have been discovered or described. These have been marked with an asterisk in the previous list.

FURTHER READING

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Checklist of Vascular Plants, of Palm Valley, Finke Gorge National Park

P.K. Latz

Conservation Commission of the Northern Territory

The families are arranged in alphabetical order, but otherwise the general terminology mostly follows that of the "Check List of Northern Territory Plants" (Chippendale 1971). Collections of all but one or two plants listed are held in the Northern Territory Herbarium, (NT).

Species marked with single asterisk are those normally restricted to sand dune areas (except for the Iseilema which is normally restricted to heavy 'black' soils).

The capital letters after each species refer to the habitat in which the species predominate.

B = creek banks and levees
C = creek beds
H = rocky hillsides
L = calcareous areas
N = ubiquitous and widespread species
R = sheltered rocky slopes
S = seepage areas
T = soil traps on rocky hillsides
W = seasonal waterholes

PALM VALLEY
PLANT CHECKLIST

	Habitat
ACANTHACEAE	
Rostellularia pogonanthera F. Muell.	L.
Sarojusticia kempeana (F. Muell.) Brem.	T.
AIZOACEAE	
Mollugo cerviana (L.) Ser.	B.
Zaleya galericulata (Melville) Eichler	B.
AMARANTHACEAE	
Achyranthes aspera L. "wait-a-while"	C.
Alternanthera denticulata R. Br.	B.
Alternanthera nana R. Br.	C.
Amaranthus interruptus R. Br.	H.
Gomphrena brachystylis F. Muell.	H.
Ptilotus atriplicifolius (A. Cunn. ex Moq.) Benl var. elderi (Farmar) Benl pussy tail	L.
Ptilotus decipiens (Benth.) Gardner	H.
P. helipteroides (F. Muell.) F. Muell.	T.
P. incanus (R. Br.) Poir.	H.
P. nobilis (Lindl.) F. Muell.	H.
P. obovatus (Gaud.) F. Muell.	N.
*P. polystachyus (Gaud.) F. Muell.	T.
P. schwartzii F. Muell. ex Tate	H.

ASCLEPIADACEAE

Leichhardtia australis R. Br. "bush banana"	T.
Sarcostemma australe R. Br. "caustic bush"	H.

ASPLENIACEAE

Pleurosorus rutifolius (R. Br.) Fee	R.

BIGNONIACEAE

Pandorea doratoxylon J.M. Black "spear wood"	H.

BORAGINACEAE

Cynoglossum australe R. Br. var. drummondii Brand.	R.
Halgania cyanea Lindl.	H.
Heliotropium asperrimum R. Br.	L.
H. curassavicum L.	W.
H. tenuifolium R. Br.	H.
Trichodesma zeylanicum (Burm. f.) R. Br. "cattle bush"	B.

BRUNONIACEAE

*Brunonia australis Sm.	C.

PALM VALLEY
PLANT CHECKLIST

CAPPARIDACEAE

Capparis mitchellii (Lindl. ex F. Muell.) Benth.	B.
Capparis spinosa L. var. nummularia (DC.) F.M. Bailey	H.
Cleome viscosa L.	H.

CAESALPINIACEAE

Cassia artemisioides Gaud. ex DC.	N.
Cassia desolata F. Muell.	H.
Cassia nemophila A. Cunn. ex Vogel	N.
Cassia nemophila var. zygophylla (Benth.) Benth.	L.
Cassia glutinosa DC.	H.
Cassia helmsii Symon	H.
Cassia pleurocarpa F. Muell.	C.
Cassia venusta F. Muell.	B.
Cassia aff. sturtii	B.
Petalostylis labicheoides R. Br. var. cassioides Benth.	H.

CAMPANULACEAE

Isotoma petraea F. Muell. "rock isotome"	R.
Wahlenbergia sp. "native bluebell"	W.

CARYOPHYLLACEAE

Polycarpaea corymbosa (L.) Lam.	W.
Spergularia diandra (Guss) Heldr. et Sart.	C.

CENTROLEPIDACEAE

Centrolepis polygyna (R. Br.) Hieron	C.

CHENOPODIACEAE

Atriplex elachophylla F. Muell.	N.
Atriplex nummularia Lindl. "old man saltbush"	B.
Chenopodium cristatum (F. Muell.) F. Muell.	B.
Chenopodium melanocarpum (J.M. Black) J.M. Black	C.
Chenopodium rhadinostachyum F. Muell.	N.
Dysphania littoralis R. Br.	W.
Dysphania plantaginella F. Muell.	W.
Maireana villosa (Lindl.) P.G. Wilson	H.
Rhagodia nutans R. Br.	B.
Rhagodia parabolica R. Br.	H.
Rhagodia spinescens R. Br.	N.
Salsola kali L. "buckbush"	N.
Sclerolaena bicornis Lindl.	B.
Sclerolaena convexula (R.H. Anderson) A.J. Scott	N.
Sclerolaena spinosa (Ewart & Davies) A.J. Scott	B.

COMPOSITAE (ASTERACEAE)

Bidens bipinnata L.	C.
Brachycome blackii Davis	R.
Brachycome ciliaris (Labill.) Less	H.
Calocephalus knappii Ewart et Davies	H.
Calocephalus platycephalus (F. Muell.) Benth.	C.
Calotis cymbacantha F. Muell.	B.
Calotis hispidula (F. Muell.) F. Muell. "bogon flea"	N.
Calotis latiuscula F. Muell. et Tate	C.
Gnaphalium involucratum Forst. f.	H.
Gnaphalium luteoalbum L.	W.
Helichrysum ambiguum Turcz.	H.
*Helichrysum bracteatum (Vent.) Andr.	C.
*Helichrysum davenportii F. Muell.	T.
Helichrysum kempei F. Muell.	R.
Helichrysum thomsonii F. Muell.	R.
Helipterum floribundum DC. "paper daisy"	N.
Helipterum saxatile P.G. Wilson	L.
Helipterum strictum (Lindl.) Benth.	R.
Helipterum tietkensii F. Muell.	T.
Lactuca serriola L. "prickly lettuce"	C.
Myriocephalus stuartii (F. Muell. et Sond. ex Sond) Benth. "poached egg daisy"	C.
Olearia ferresii (F. Muell.) F. Muell. ex Benth.	R.

COMPOSITAE (ASTERACEAE) Continued......

Olearia stuartii (F. Muell.) F. Muell. ex Benth.	R.
Olearia sp.	
Pluchea dentex R. Br. ex Benth.	R.
Pluchea rubelliflora (F. Muell.) B.L. Robinson	L.
Podocoma sp.	T.
*Podolepis canescens A. Cunn. ex DC.	T.
Pterigeron odorus (F. Muell.) Benth.	L.
Pterocaulon glandulosum (F. Muell. ex Benth.) Benth. et Hook. f. var. velutinum Ewart and Davies	C.
Pterocaulon sphacelatum (Labill.) Benth ex Hook. f.	W.
*Senecio gregorii F. Muell.	C.
Senecio lateratus (F. Muell.) Belcher	H.
Senecio lautus Forst. f. ex Willd. aff. spp. dissectifolius Ali	C.
Sigesbeckia orientalis L.	C.
Sonchus aspera (L.) Hill. "sow thistle"	C.
Sonchus oleraceus L.	C.
Vittadinia scabra DC.	C.
Vittadinia sp.	L.
*Waitzia acuminata Steetz	T.
Wedelia stirlingii Tate	H.

CONVOLVULACEAE	
Convolvulus erubescens Sims. "bird weed"	B.
Evolvulus alsinoides L. var. villosicalyx Ootstr.	H.
Ipomea aff. plebeja R. Br.	C.
Ipomea polymorpha R. et S.	C.
CRASSULACEAE	
Crassula sieberiana (Schultes) Druce	R.
CRUCIFERAE (BRASSICACEAE)	
Brassica tournefortii Gouan "wild mustard"	N.
Lepidium muelleri-ferdinandi Thell.	R.
Lepidium oxytrichum Sprague	B.
Lepidium rotundum (Desv.) DC.	B.
Stenopetalum decipiens E.A. Shaw	H.
Stenopetalum lineare R. Br. ex DC.	L.
Stenopetalum velutinum F. Muell.	H.
CUCURBITACEAE	
Citrullis colocynthus (L.) Schrad. "colocynth"	B.
Melothria maderaspatana (L.) Cogn.	B.
CUPRESSACEAE	
Callitris glauca R. Br. ex R.T. Bak. et H.G.Sm. "white cypress"	H.

CYPERACEAE

Bulbostylis barbata (Rottb.) C.B. Clarke	T.
Bulbostylis turbinata S.T. Blake	T.
Cyperus bulbosus Vahl.	C.
Cyperus cunninghamii (Clarke) C.A. Gardn.	H.
Cyperus aff. dactylotes Benth.	C.
Cyperus gymnocaulos Steud.	C.
Cyperus vaginatus R. Br.	C.
Cyperus victoriensis C.B. Clarke	C.
Eleocharis geniculata (L.) R. & S.	W.
Fimbristylis sieberiana Kunth	S.
Fimbristylis dichotoma L.	N.
Scirpus littoralis Schrad.	W.

DILLENIACEAE

Hibbertia glaberrima (F. Muell.) J. Muell.	R.

EUPHORBIACEAE

*Adriana hookeri (F. Muell.) J. Muell.	C.
Euphorbia australis Boiss.	N.
Euphorbia coghlanii F.M. Bail.	B.
Euphorbia eremophila A. Cunn.	N.
Phyllanthus rhytidospermus F. Muell.	B.

GENTIANACEAE

Centaurium spicatum (L.) Fritch	S.

GERANIACEAE

Erodium aureum Carolin	H.
Erodium crinitum Carolin "storkbills"	T.
Erodium cynorum Nees ssp. glandulosum Carolin	L.

GOODENIACEAE

Goodenia armitiana F. Muell.	H.
Goodenia horniana Tate	R.
Goodenia ? odonnellii F. Muell.	R.
Goodenia sp.	T.

GRAMINEAE (POACEAE)

Aristida browniana Henr. "kerosene grass"	B.
Aristida capillifolia Henr.	R.
Aristida contorta F. Muell. "mulga grass"	T.
Aristida nitidula (Henr.) S.T. Blake	H.
Aristida strigosa (Henr.) S.T. Blake	B.
Bothriochloa ewartiana (Domin) C.E. Hubb. "desert blue grass"	C.
Brachiaria milliiformis (C.B. Presl.) Chase	C.
Brachiaria praetervisa (Domin) C.E. Hubb.	C.
Cenchrus ciliaris L. "buffel grass"	C.

GRAMINEAE (POACEAE) Continued.....

Chloris virgata Swartz "feathertop rhodes grass"	N.
Cymbopogon ambiguus A. Camus	H.
Cynodon dactylon (L.) Pers. "couch"	C.
Dactyloctenium radulans (R. Br.) Beauv. "button grass"	N.
Digitaria brownii (R. et S.) Hughes	N.
Digitaria ctenantha (F. Muell.) Hughes	H.
Diplachne fusca (L.) P. Beauv.	W.
Diplachne parviflora (R. Br.) Benth	W.
Enneapogon avenaceus (Lindl.) C.E. Hubb.	L.
Enneapogon cylindricus N.T. Burbidge	L.
Enneapogon lindleyanus (Domin) C.E. Hubb.	L.
Enneapogon oblongus N.T. Burbidge	H.
Enneapogon pallidus (R. Br.) Beauv.	C.
Enneapogon polyphyllus (Domin) N.T. Burbidge	N.
Enneapogon purpurascens (R. Br.) Beauv.	L.
Enteropogon acicularis (Lindl.) Lazar. "curly windmill"	C.
Eragrostis barrelieri Daveau.	N.
Eragrostis aff. cummingii Steud.	C.
Eragrostis dielsii Pilger "mallee lovegrass"	B.
Eragrostis elongata (Wild.) J.F. Jacq.	C.
Eragrostis eripoda Benth. "woolly butt"	T.
Eragrostis falcata Gaud.	L.

GRAMINEAE (POACEAE) Continued......

Eragrostis lacunaria F. Muell. ex Benth.	H.
Eragrostis leptocarpa Benth. "lovegrass"	W.
Eragrostis sp. aff. eriopoda	T.
Eriachne mucronate R. Br. "wanderrie grasses"	H.
Eriachne pulchella Domin	T.
Eriochloa pseudoacrotricha (Stapf ex Thell.) C.E. Hubb. ex S.T. Blake	C.
Eulalia fulva (R. Br.) Kuntze "silky browntop"	C.
Imperata cylindrica (L.) Beauv. var. major (Nees) C.E. Hubb	S.
*Iseilema membranaceum (Lindl.) Domin "flinders grass"	C.
Leptochloa digitata (R. Br.) Domin	C.
Panicum decompositum R. Br.	H.
*Paractaenum novae-hollandiae Beauv.	C.
*Paspalidium basicladum Hughes	C.
Paspalidium clementii (Domin) C.E. Hubb.	4.
Paspalidium constrictum (Domin) C.E. Hubb.	H.
Perotis rara R. Br.	N.
Phragmites australis (Cav.) Trin. ex Steud.	W.
*Plagiosetum refractum (F. Muell.) Benth.	C.
Plectrachne melvillei C.E. Hubb. "a spinifex"	H.

GRAMINEAE (POACEAE) Continued.....

Setaria dielsii Herm.	C.
Themeda australis (R. Br.) Stapf. "kangaroo grass"	C.
Tragus australianus S.T. Blake	N.
Triodia clelandii N.T. Burbidge "spinifex"	H.
Triodia longiceps J.M. Black "spinifex"	L.
Tripogon loliiformis (F. Muell.) C.E. Hubb	T.
Triraphis mollis R. Br.	C.
Zygochloa paradoxa (R. Br.) S.T. Blake "sandhill canegrass"	C.

HALORAGACEAE

Haloragis gossei F. Muell.	L.
Haloragis uncatipila Orchard	?

JUNACEAE

Juncus aridicola L. Johnson	R.

LABIATAE (LAMIACEAE)

Plectranthus intraterraneus S.T. Blake	R.
Prostanthera baxteri A. Cunn. var sericea J.M. Black	H.
Prostanthera striatiflora F. Muell. "mint bush"	H.
Teucrium grandiusculum F. Muell. et Tate	C.

LILIACEAE

Lomandra patens A. Lee	R.

LORANTHACEAE

Amyema gibberula (Tate) Danser "mistletoe"	N.
Amyema maidenii (Blakely) Barlow "mistletoe"	N.
Lysiana exocarpi (Behr. ex Schlect.) Tiegh.	N.
Lysiana spathulata Barlow	N.

LYTHRACEAE

Ammania multiflora Roxb.	W.

MALVACEAE

Abutilon fraseri (Hook.) Hook. ex Walt.	L.
Abutilon leucopetalum (F. Muell.) F. Muell. ex Benth.	H.
Gossypium sturtianum J.H. Willis "Sturts desert rose"	L.
Hibiscus solanifolius F. Muell.	H.
Hibiscus leptochedus Benth.	H.
Lavatera plebia Sims "native hollyhock"	C.
Malvastrum americanum (L.) Torr.	B.
Sida cryphiopetala F. Muell.	H.
Sida fibulifera Lindl.	H.
Sida rholenae Domin	B.

MARSILEACEAE

Marsilea drummondii R. Br. "nardoo"	W.

MIMOSACEAE

Acacia anuera F. Muell. ex Benth. "mulga"	T.
Acacia bivenosa DC. subsp. wayii (Maiden) Pedley	L.
Acacia farnesiana (L.) Willd.	H.
Acacia kempeana F. Muell. "witchetty bush"	L.
Acacia macdonnelliensis Maconochie	H.
Acacia melleodora Pedley	H.
Acacia spondylophylla F. Muell.	H.
Acacia strongylophylla F. Muell.	H.
Acacia tetragonophylla F. Muell. "dead finish"	H.
Acacia victoriae Benth.	B.

MORACEAE

Ficus platypoda (Miq.) A. Cunn. ex Miq. var. minor Benth. "native fig."	H.

MYOPORACEAE

Eremophila christopheri F. Muell.	L.
Eremophila freelingii F. Muell.	H.
Eremophila goodwinii F. Muell.	H.
Eremophila latrobei F. Muell. "fuschia bush"	N.
Eremophila longifolia (R. Br.) F. Muell.	B.
Myroporum montanum R. Br.	C.

PALM VALLEY
PLANT CHECKLIST

MYRTACEAE

Baeckea polystemona F. Muell.	R.
Eucalyptus camaldulensis Dehnh. "river red gum"	C.
Eucalyptus intertexta R.T. Bak. "coolabah"	L.
Eucalyptus papuana F. Muell. "ghost gum"	H.
Eycalyptus sessilis (Maiden) Blakely	H.
Eucalyptus terminalis F. Muell. "blood wood"	B.
Eucalyptus polycarpa F. Muell.	
var oligocarpa Blakely et Jacobs	H.
Melaleuca glomerata F. Muell.	C.
Melaleuca linariifolia Sm.	C.
Thryptomene wittweri J. Green	R.

NAIADACEAE

Naias marina L.	W.

NYCTAGINACEAE

Boerhavia diffusa L.	N.

OLEACEAE

Jasminum lineare R. Br. "native jasmine"	H.

OXALIDACEAE

Oxalis corniculata L.	R.

PALM VALLEY
PLANT CHECKLIST

PALMAE (ARECACEAE)

Livistona mariae F. Muell. "cabbage palm"	S.

PAPILIONACEAE (FABACEAE)

Crotalaria dissitiflora Benth. "rattle pods"	C.
*Crotalaria novae-hollandiae DC.	C.
Crotalaria eremaea F. Muell. ssp. strehlowii (E. Pritz.) A. Lee	C.
Crotalaria medicaginea Lam.	B.
Glycine canescens F.J. Herm.	C.
Indigofera basedowii E. Pritz.	H.
Indigofera brevidens Benth. var. uncinata Benth.	H.
Indigofera colutea (Brum. f.) Merr.	L.
Indigofera linnaei S. Ali "birdsville indigo"	T.
Indigofera leucotricha E. Pritz.	L.
Lotus cruentus Court	C.
Psoralea australasica Schltdl.	C.
Rhynchosia minima (L.) DC.	C.
Swainsona flavicarinata J.M. Black	C.
Tephrosia eriocarpa Benth.	H.

PITTOSPORACEAE

Pittosporum phylliraeoides DC. "wild apricot"	B.

POLYGONACEAE

Polygonum lapathifolium L.	W.
Rumex vesicarius L. "rosy dock"	N.

POLYPODIACEAE

Cheilanthes lasiophylla Pic. - Ser. "rock fern"	H.
Cheilanthes sieberi Kuntze	H.
Cheilanthes tenuifolia (Brum. f.) Swartz	H.

PORTULACACEAE

Anacampseros australiana J.M. Black	H.
*Calandrinia balonensis Lindl. "parakeelya"	T.
Calandrinia eremaea Ewart	H.
Calandrinia ptychosperma F. Muell.	T.
*Calandrinia remota J.M. Black	T.
Calandrinia spergularina F. Muell.	W.
Portulaca filifolia F. Muell.	B.
Portulaca oleracea L.	N.

PRIMULACEAE

Samolus eremaeus S. Jacobs	S.

PROTEACEAE

Grevillea striata R. Br. "beef wood"	B.
Grevillea wickhamii Meisn.	H.
Hakea suberea S. Moore "cork wood"	B.

POTAMOGETONACEAE

Potamogeton tricarinatus A. Bennett	W.

RHAMNACEAE

Spyridium spathulatum (F. Muell.) F. Muell. ex Benth.	H.

RUBIACEAE

Canthium attenuatum R. Br. ex Benth.	C.
Canthium latifolium F. Muell. ex Benth. "wild currant"	H.
Pomax umbellata (Gaertn.) Soland. ex A. Rich.	H.
Synaptantha tillaeacea (F. Muell.) Hook f.	C.

SANTALACEAE

Santalum lanceolatum R. Br. "plum bush"	C.

SAPINDACEAE

Atalaya hemiglauca (F. Muell.) F. Muell. ex Benth. "white wood"	B.
Dodonaea lanceolata F. Muell.	H.
Dodonaea viscosa Jacq. var spatulata (Sm.) Benth.	H.
Heterodendrum oleifolium Desf. "bullock bush"	B.

SCHEUCHZERIACEAE (JUNCAGINACEAE)

Triglochin calcitrapa Hook.	W.
Triglochin centrocarpa Hook.	W.
Triglochin hexatona J.M. Black	W.

SCROPHULARIACEAE

Stemodia viscoa Roxb.	W.

SOLANACEAE

Datura leichardtii F. Muell. "thorn apple"	B.
Nicotiana gossei Domin "wild tobacco"	R.
Nicotiana megalosiphon Heurch et J. Muell.	C.
Nicotiana simulans Burbidge	C.
Nicotiana velutina Wheeler	C.
Nicotiana sp.	L.
Solanum ellipticum R. Br. "wild tomato"	H.
Solanum orbiculatum Dun.	H.
Solanum quadriloculatum F. Muell.	B.
Solanum sturtianum F. Muell.	B.
Solanum aff. ellipticum	4.

STERULIACEAE

Melhania oblongifolia F. Muell.	L.
Rulingia magniflora F. Muell.	B.
Waltheria indica L.	B.

THYMELAEACEAE	
Pimelea trichostachya Lindl.	T.
Pimelea sp.	R.
TILIACEAE	
Corchorus sidioides F. Muell.	T.
TYPACEAE	
Typha domingensis Pers. "bullrush"	W.
UMBELLIFERAE (APIACEAE)	
Daucus glochidiatus (Lab.) Fisch., Mey. et Ave-Lav.	R.
Hydrocotyle trachycarpa F. Muell.	R.
Trachymene glaucifolia (F. Muell.) Benth. "wild parsnip"	C.
ZAMIACEAE	
Macrozamia macdonnellii (F. Muell. ex Miq.) A. DC.	R.

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